

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

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WIPO PCT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 2021202PC/or	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/FI 2003/000637	International filing date (day/month/year) 01.09.2003	Priority date (day/month/year) 02.09.2002
International Patent Classification (IPC) or national classification and IPC C03B 37/025, C03B 23/047		
Applicant NEXTROM HOLDING S.A. et al		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:

- a. ☒ (sent to the applicant and to the International Bureau) a total of 4 sheets, as follows:
 - ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
 - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

- b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

- | | |
|---|---|
| <input checked="" type="checkbox"/> Box No. I | Basis of the report |
| <input type="checkbox"/> Box No. II | Priority |
| <input type="checkbox"/> Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> Box No. VI | Certain documents cited |
| <input type="checkbox"/> Box No. VII | Certain defects in the international application |
| <input type="checkbox"/> Box No. VIII | Certain observations on the international application |

Date of submission of the demand 01.03.2004	Date of completion of this report 04.10.2004
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Form PCT/IPEA/409 (cover sheet) (January 2004)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/FI 2003/000637

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ This report is based on a translation from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

- ☐ international search (under Rules 12.3 and 23.1(b))
☐ publication of the international application (under Rule 12.4)
☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

☐ the international application as originally filed/furnished

☒ the description:

pages 1 - 9 _____ as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☒ the claims:

pages _____ as originally filed/furnished

pages* _____ as amended (together with any statement) under Article 19

pages* 1 - 4 _____ received by this Authority on 11.08.2004

pages* _____ received by this Authority on _____

☒ the drawings:

pages 1 _____ as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing (*specify*): _____

☐ any table(s) related to the sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheets/figs _____

☐ the sequence listing (*specify*): _____

☐ any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/FI 2003/000637

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1-28</u>	YES
	Claims		NO
Inventive step (IS)	Claims	<u>1-28</u>	YES
	Claims		NO
Industrial applicability (IA)	Claims	<u>1-28</u>	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Documents cited in the International Search Report:

D1: US 4608071 A
D2: US 6438997 B1
D3: US 5755849 A
D4: US 4121920 A

In view of the amended claims filed with the letter of 11-08-2004 D1 is re-evaluated as representing the state of the art. Consequently, all cited documents represent the general state of the art.

The invention defined in claims 1-28 is not disclosed by any of these documents.

The cited prior art does not give any indication that would lead a person skilled in the art to the claimed device and for processing/stretching a preform or the device and method for drawing an optical fibre from a preform. Therefore, the claimed invention is not obvious to a person skilled in the art.

Accordingly, the invention defined in claims 1-28 is novel and is considered to involve an inventive step. The invention is industrially applicable.

Claims

1. A device for processing/stretching a preform (2), the device comprising at least two gripping means (4, 6) for securing the preform (2) to the processing device, at least one heating device (12) for heating the preform or a section thereof to a desired temperature, the gripping means (4, 6) and the heating device (12) being arranged movable **characterized** in that the gripping means (4, 6) and the heating device (12) are arranged optionally movable so that they allow the end product produced to be held in position during the processing process relative to the body of the processing device, irrespective of the direction of the processing/stretching, by holding the gripping means on the side of the end product of the preform in position relative to the body of the processing device.

2. A device as claimed in claim 1, **characterized** in that the gripping means (4, 6) and the heating device (12) are arranged such that the speed of movement and direction of movement of each of them are separately adjustable.

3. A device as claimed in claim 1 or 2, **characterized** in that it comprises means (14, 16) for rotating the preform (2) around its longitudinal axis during the processing.

4. A device as claimed in any one of claims 1 to 3, **characterized** in that it further comprises one or more independently movable cutting device for cutting the preform and/or a fibre.

5. A method of processing/stretching a preform (2) comprising the steps of:

securing the preform (2) to a processing device by means of at least two separate independently movable gripping means (4, 6);

heating the preform (2) or a section thereof by means of at least one independently movable heating device (12) at least locally; and

generating a tension in the preform (2) by moving at least one of the gripping means (4, 6);

characterized in that the method further comprises step of:

processing the preform (2) by feeding it to the heating device (12) by moving one of the gripping means (4, 6) and the heating means (12) and by holding the gripping means (4, 6) on the side of the end product of the preform in position relative to the body of the processing device whereby the end prod-

uct produced also remains in position relative to the body of the processing device, irrespective of the direction of the processing/stretching.

6. A method as claimed in any one of claims 5, **characterized** in that the speed of movement and the direction of movement of each gripping means (4, 6) and heating device (12) are separately adjustable.

7. A method as claimed in any one of claims 5 to 6, **characterized** by performing the processing/stretching of the preform vertically from the top downwards.

8. A method as claimed in any one of claims 5 to 6, **characterized** by performing the processing/stretching of the preform vertically from the bottom upwards.

9. A method as claimed in any one of claims 5 to 8, **characterized** by rotating the preform (2) around its longitudinal axis during the processing.

10. A method as claimed in any one of claims 5 to 9, **characterized** by using two or more heating devices (12) in the processing of the preform.

11. A method as claimed in claim 10, **characterized** by adjusting the speed and direction of movement of each heating device (12) separately.

12. A method as claimed in any one of claims 5 to 11, **characterized** by using the method for correcting variations in the diameter of the preform.

13. A method as claimed in any one of claims 5 to 11, **characterized** by using the method for correcting the roundness of the preform.

14. A method as claimed in any one of claims 5 to 11, **characterized** by utilizing the method in association with a sleeving process.

15. A method as claimed in any one of claims 5 to 11, **characterized** by utilizing the method in association with a collapsing process.

16. A device for drawing an optical fibre from a preform, the device comprising at least two gripping means, of which at least one is provided with coiling means for the optical fibre, for securing the preform to the drawer, and at least one heating device for heating the preform or a section thereof to a desired temperature, the gripping means and the heating device being arranged movable **characterized** in that that gripping means and the heating device are arranged optionally movable such that irrespective of the

selected drawing direction, the heating device and one of the gripping means are movable relative to the body of the drawer and to the other gripping means, which is immovable relative to the body of the drawer and to which a coiling device is connected for coiling the end product/optical fibre to a coil, whereby both a heating device and the gripping means that is movable relative to the body of the drawer move relative to the coiling device that receives the end product/optical fibre.

17. A device as claimed in claim 16, **characterized** in that the gripping means and the heating devices are arranged such that the speed of movement and the direction of movement of each of them are separately adjustable.

18. A device as claimed in claim 16 or 17, **characterized** in that it comprises devices for rotating the preform around its longitudinal axis during the processing.

19. A device as claimed in any one of claims 16 to 18, **characterized** in that coiling means are arranged in each of the gripping means.

20. A device as claimed in any one of claims 16 to 19, **characterized** in that it also comprises one or more independently movable cutting device for cutting the preform and/or the fibre.

21. A method of drawing an optical fibre from a preform comprising the steps of:

securing the preform to a drawer by means of at least two separate independently movable gripping means;

heating the preform or a section thereof by means of at least one independently movable heating device at least locally;

generating a tension in the preform by moving at least one of the gripping means;

characterized in that the method further comprises steps of:

drawing optical fibre from the preform by moving one of the gripping means and the heating device and by holding the gripping means on the side of the produced optical fibre in position relative to the body of the drawer; and

coiling the produced optical fibre with a coiling device arranged in the gripping means that is immobile relative to the body of the drawer onto a coil, whereby both a furnace and the gripping means that is movable relative to

the body of the drawer move relative to the coiling device that receives the end product/optical fibre irrespective of the selected drawing direction.

22. A method as claimed in any one of claims 21, **characterized** in that the speed of movement and the direction of movement of each gripping means and heating device are separately adjustable.

23. A method as claimed in any one of claims 21 to 22, **characterized** by performing the drawing of the optical fibre vertically from the top downwards.

24. A method as claimed in any one of claims 21 to 22, **characterized** by performing the drawing of the optical fibre vertically from the bottom upwards.

25. A method as claimed in any one of claims 21 to 24, **characterized** by rotating the preform around its longitudinal axis during the drawings.

26. A method as claimed in any one of claims 21 to 25, **characterized** by using two or more heating devices in the drawing.

27. A method as claimed in claim 26, **characterized** by adjusting the speed and direction of movement of each heating device separately.

28. A method as claimed in any one of claims 21 to 27, **characterized** by using the method in shaping a tubular preform for both adjusting the diameter and adjusting the wall thickness.